**NATURAL RESOURCES CONSERVATION SERVICE**
**CONSERVATION PRACTICE STANDARD**

# PASTURE AND HAY PLANTING

**(Acre)**

**CODE 512**

## DEFINITION

Establishing native or introduced forage species.

## PURPOSES

This practice may be applied as part of a conservation management system to accomplish one or more of the following purposes:

- Establish adapted and compatible species, varieties, or cultivars.
- Improve or maintain livestock nutrition and/or health.
- Extend the length of the grazing season.
- Provide emergency forage production.
- Reduce soil erosion by wind and/or water.
- Improve water quality by reducing runoff.

## CONDITIONS WHERE PRACTICE APPLIES

This practice may be applied on cropland, hayland, pastureland, and other agricultural lands where forage production is feasible and desired. It may also be used in conjunction with Practice Code 460 - Land Clearing.

## CRITERIA

**General criteria applicable to all the purposes stated above.**

Plant species and their cultivars shall be selected based upon:

- Climatic conditions, such as annual rainfall, seasonal rainfall patterns, growing season length, humidity levels, temperature extremes and the USDA Plant Hardiness Zones.
- Soil condition and position attributes such as pH, available water holding capacity, aspect, drainage class, inherent fertility, and flooding and ponding.
- Plant resistance to disease and insects common to the site or location.
- Plant compatibility with other forage species and their selected cultivar(s) in rate of establishment, maturity, and growth habit when seeded together as a forage mixture.

Specified seeding/plant material rates, methods of planting and date of planting shall be consistent with documented guidance cited by research institutions or agency demonstration trials for achieving satisfactory establishment such as “Cornell Recommends” or VT Forages Home page. (See references)

Seeding rates will be calculated on a pure live seed (PLS) basis or percent germination.

**Table 1 – Recommended Seeding Mixtures**

| | | Seeding Suitable For: (1) | | |
|---|---|---|---|---|
| **Seed Mixtures** | **Pounds PLS per Acre (2)** | **Silage** | **Hay** | **Pasture** |
| Alfalfa (3) | 8 to 12 | 2 | 2 | 1 |
| Smooth Bromegrass or | 3 to 6 | | | |
| Orchard Grass or | 2 to 4 | | | |
| Timothy | 2 to 4 | | | |
| Alfalfa | 4 to 6 | 3 | 3 | 1 (5) |
| Smooth Bromegrass | 10 | | | |
| Orchard Grass | | | | |
| Red Clover | 8 to 12 | 1 | 2 | 2 |
| Timothy | 3 to 5 | | | |
| Alsike Clover | 5 | 2 | 2 | 1 |
| Ladino Clover and | 1 to 2 | | | |
| Timothy or | 4 | | | |
| Smooth Bromegrass | 8 | | | |
| Alsike Clover | 5 | 2 | 2 | 2 |
| Timothy or | 4 | | | |
| Smooth Bromegrass | 8 | | | |
| Alfalfa (4) | 8 to 12 | 2 | 2 | 1 |
| Smooth Bromegrass | 6 to 8 | | | |
| Reed Canarygrass | 3 to 5 | 3 | 2 | 1 |
| Timothy | 2 to 3 | | | |
| Birdsfoot Trefoil | 6 | 2 | 2 | 1 |
| Bluegrass or | 2 | | | |
| Timothy | 3 to 4 | | | |

**Footnotes:**

1 Suitability rating is for this mixture: 1 - Preferred. 2 - Second choice. 3 - Not recommended.
2 PLS = Pure Live Seed.
3 ¼ to ½ lbs. of Ladino Clover may be added where bloating is not a problem.
4 For use on sandy soils.
5 If phytophthora root rot resistant varieties used.

**Table 2 – Recommend Pure Stand Rates (drilled)**

| **Grasses** | **Pounds PLS per Acre** | **Legumes** | **Pounds PLS per Acre** |
|---|---|---|---|
| Orchard Grass | 8-12 | Alfalfa | 12-15 |
| Reed Canarygrass | 5-8 | Alsike Clover | 4-6 |
| Smooth Bromegrass | 16 | Birdsfoot Trefoil | 6 |
| Tall Fescue | 10-15 | Ladino Clover | 3 |
| Timothy | 3-6 | Red Clover | 6 |

Provide a firm, weed-free seedbed that ensures seed will contact soil moisture uniformly, facilitates seedling emergence, and provides a medium that does not restrict or allow roots to become dry.

Use conservation and no-till planting methods to establish forage plants on land subject to erosion, and/or to conserve soil moisture and organic matter.

Apply all plant nutrients according to a soil test. Required lime should be applied and incorporated at least six months prior to seeding. (Allow longer than six months if no-till is planned) Subsequent nutrient management will be according to a Nutrient Management Plan.

All seed and planting materials shall be labeled and meet or exceed state seed quality law standards.

Legume seed shall be inoculated with the proper, viable rhizobia before planting.

For pesticide and herbicide use with planting, (and for operation and maintenance) contact the Extension Service for current information and recommendations.

**Additional criteria for improving or maintaining livestock nutrition and/or health.**

Forage species must be capable of meeting the desired level of nutrition for the kind and class of the livestock to be fed.

**Additional criteria for extending the grazing season.**

Forage species selected for establishment shall fulfill a recognized dietary deficiency within the year long forage management program.

**Criteria for providing emergency forage production.**

Select plants that will produce forage for use during periods when other on-farm/ranch forage is unavailable to meet livestock needs.

**Criteria for reducing erosion by wind and/or water.**

Plants shall have the ability to provide adequate ground cover, canopy cover, root mass, and vegetal retardance to wind forces and water flows either alone or in combination with other forage species when site conditions require erosion protection.

## CONSIDERATIONS

Prescribed Grazing, Brush Management, and Land Clearing practices may be used in combination with Pasture and Hay Planting.

Where wildlife management is an objective, the food and cover value of the planting can be enhanced by using an approved habitat evaluation procedure to aid in selecting plant species and providing for other habitat requirements necessary to achieve the objective.

Forage species planted in mixture should exhibit similar palatability to one another to avoid spot or selective grazing.

Generally, pasture mixtures containing perennial legumes will produce higher yields and better forage quality than will pure stands of grass.

Bloat is a potential hazard when legumes are included in pasture mixes.

In most cases, pasture production will be increased more by proper management of existing stands of forage than by interseeding or reseeding. Longevity and persistence will be increased by rotational grazing systems that provide plant recovery periods and discourage selective grazing.

## PLANS AND SPECIFICATIONS

Specifications for the establishment of pasture and hay plantings shall be prepared for each site or management unit according to the Criteria, Considerations, and Operations and Maintenance described in this standard, and shall be recorded on specification sheets, job sheets, in narrative statements in the conservation plan, or other acceptable documentation.

**Conventional Seeding**

Prepare a seedbed to a minimum depth of 3 inches. The seedbed should be firm, relatively free of competing vegetation and contain enough fine soil particles for uniform shallow coverage of the seed as well as contact with moisture and nutrients. As a general rule, a seedbed is firm when an adults footprint is no more that one-half inch deep.

On fields where the predominant slope is greater than 8% all tillage and planting operations must be on a contour and seeding will be done with the use of a companion (nurse) crop or by leaving at least 30% of the crop residue on the surface after planting.

Oats sown at a rate of 1to 1 1/2 bushels per acre is a good companion crop for spring seedings. Use of a companion crop is a good option where weeds may be a concern. Mow and remove oats at boot stage or graze lightly when oats are 10 inches high.

Grass and legume seed shall be drilled uniformly over the area at a depth of ¼ to ½ inch using a grassland drill, grain drill with press wheels, cultipacker seeder, or by broadcasting and cultipacking before and after broadcasting the seed.

**Frost Seeding**

Frost seeding is sowing seed on the soil surface that has been made friable by freezing and thawing. The soil surface is usually honeycombed with small cracks. The seedings are made in March or early April into either fall seeded winter annuals or closely clipped or killed pasture.

Frost seeedings shall not be made on areas covered with ice or snow, but must be made before frost leaves the soil.

Frost seedings will mainly be used to interseed legumes into existing pasture areas. Seeding rates will be 2/3 of the pure stand rate in Table 1.

**Seeding Periods**

The specific date that provides for a successful seeding will vary from north to south, with elevation and exposure, and from year to year with prevailing moisture and temperature conditions. Late summer seeding is generally riskier than spring seeding.

Seeding dates are as follows for perennial cool season grasses and legumes:

**Suggested Seeding Dates**
by Conservation Resource Area (CRA)

| CRA | Spring | Late Summer |
|---|---|---|
| 143.VT1 Green Mts. NE Kingdom | May 1 To June 15 | July 15 To August 10 |
| 144B.VT1 Green Mt Foothills | April 15 To June 1 | August 1 To August 21 |
| 142.VT1 Champlain Valley | April 15 To May 15 | August 7 To Sept. 15 |
| 144A.VT1 145.VT1 Connecticut River Valley | April 15 To May 30 | August 7 To Sept. 15 |

If seeding warm season grasses use "Vegetating with Native Grasses in Northeastern North America" a guide. (www.ny.nrcs.usda.gov)

**Liming and Fertilizing**

Refer to Practice Standard 590 - Nutrient Management (590) to develop recommendations.

When possible, apply and incorporate limestone at least six months before seeing mixtures that include legumes. Alternatively, if lime is not incorporated, apply needed lime 1 to 2 years ahead of seeding.

Do not add nitrogen at the time of seeding when interseeding or no-till seeding (unless 100% cool season grasses).

**Seed**

All seed shall be high quality and meet all requirements of Vermont Seed Laws and current Noxious Weed Control laws. Certified seed should be used when available.

Seed quality of any species can change following initial seed tests. Germination may decline over time; especially when seed is subjected to uncontrolled humidity, moisture, or high temperature. If seed is held over from one year to another, or poorly stored, retest. Pure Live Seed (PLS) should be recalculated and seeding rates again given based on PLS.

Legume seed shall be innoculated specific to the legume. When more than one legume seed is used, each will be innoculated separately.

**Species Selection**

Select one of the seeding mixtures from Table 2; other mixtures may be developed by the conservation planner.

Any seeding mixture developed outside of those in Table 2 must be approved by the state agronomist or resource conservationist.

Guidelines for Mixture Development

- Based on the predominant soil type, find the appropriate pasture and hayland suitability group in Section II of the VT NRCS Field Office Technical Guide.
- Identify species that are suited to "Forage Suitability Groups"
- Use only the species that are identified as suitable.
- Species planned for pasture or hayland should be compatible with the planned management of the entire operating unit. [This could be part of planning process in (590) CNMP standard; "Land Treatment" or "Feed Management"]
- For ease of management, mixtures will consist of no more than two grasses having similar growth habit and similar season of use. No more than two legumes with similar management needs may be added to the grasses.
- When two grasses are selected they shall comprise an equal percentage of their full seeding rate.
- On pastureland, grasses should comprise at least 30% of the mixture.
- Refer to the Vermont Extension Home page or the latest "Cornell Recommends" for variety selection. (hardiness, disease resistance, expected harvest dates and yields)

**Seeding Rate**

Full seeding - Refer to crop variety links @ Vermont Extension Service web site (http://pss.uvm.edu/vtcrops/index.html) or "Cornell Recommends" and Tables 1 and 2.

Interseeding - Seed at one-half of full seeding rate.

**Management During Establishment**

NEW SEEDINGS shall not be grazed until 40 days after emergence or until plants are large enough to be grazed without stand damage.

Competitive weeds will be controlled by one of the following methods**.**

- Mowing for cool season plantings, weeds and weedy grasses should be mowed when they reach a height of 6-8 inches. Do not mow lower than 3-4 inches. Mowing should be done before the weeds begin to compete for moisture and/or before they set seed.
- Herbicides can be used to control some species of weeds. See Pest Management (595) for a current list of appropriate references and CAUTIONS.

**Stand Evaluation**

To evaluate a new or existing stand for forage production refer to Wisconsin Agronomy Technical Note 1, Guidelines for Herbaceous Stand Evaluation.

**OPERATION AND MAINTENANCE**

Growth of seedlings or sprigs shall be monitored for water stress. Water stress may require reducing weeds, early harvest of any companion crops, irrigating when possible, or replanting failed stands, depending on the severity of drought.

Invasion by undesirable plants shall be controlled by cutting, using a selective herbicide, or by grazing management by manipulating livestock stocking rates, density, and duration of stay.

Insects and diseases shall be controlled when an infestation threatens stand survival.

## REFERENCES

http://www.wi.nrcs.usda.gov/technote for Wisconsin Tech note #1

http://pss.uvm.edu/vtcrops

http://www.css.cornell.edu/extension/CornellGuide for “Cornell Recommends”

http://www.hort.purdue.edu/newcrop/afcm/index.html Alternative field crops manual.

http://www.msue.msu.edu/fis/ Forage Information System at Mich. State U